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The Personalization of Educational Media

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What will happen to "mass education" in an era of personal communication?

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by Sandra E. Moriarty and Ted W. Vaughan

The educational press is filled with articles about computers and what their impact will be on education. The big picture of technological change at the end of the 20th century has more significance to education than simply the effect of computers; however, this survey of technological change will look first at the impact of new technology on mass media, spot observable cultural and social trends created by these changes, and then analyze the effect of these trends on education.

Elements of Technological Change

1. Personal Computers

Silicone Valley's greatest contribution to civilization, the microchip, has brought miniaturization to all kinds of information systems and, as a result, has made the power of computers available to everyone. Our watches, cars, televisions, and soon our homes, businesses and schools will be run by microcircuits.

Computers deal in information, any information that can be expressed in binary form, and we are finding that more and more information can be converted to ones and zeros. First, numbers and words were converted; then came visual information such as drawings, charts, photographs, and television pictures. Now engineers have developed high-fidelity audio in digital form and are making breakthroughs in voice recognition and generation. Soon we will be able to carry on normal voice conversations with computers who speak through the words of the program's author.

2. Video Images

The continuing improvement of video images eventually will produce the quality of graphic image production we are accustomed to seeing in commercial cinema. Digitizing

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permits far better detail and more faithful reproduction of color values. The development of digital, high-definition video is already well underway. Most video special effects are digitally created.

Another benefit of digital video is international standardization. Currently, American TV screens scan images with a 525-line NTSC system which is below the quality of European screens that use the 625-line PAL standard. A Japanese company has developed a system that reproduces images with 1,125 horizontal lines.[1] Should digital video be universally adopted, incompatibility problems would be removed, and the quality of video imaging would be substantially improved.

In addition to improving the quality of image resolution on television, the technology now exists to reproduce the images in three dimensions. The Visidep system creates the illusion of depth by using multiple cameras and alternating images.[2] When Visidep becomes available to the consumer market, it will be possible to watch 3-D television without wearing funny glasses.

3. Printing

With electronic, plateless printing it is now possible to eliminate most of the dirty drudgery involved in print production. Using laser scanning, digitized images and ink jet printing, we are not far from a day when we will see clean, instant printing providing the quality of the finest rotogravure.

Another change in printing involves a tie-in with video technology. A new Mitsubishi television comes with a built-in thermal printer.[3] The Mitsubishi TV, among other things, is one step closer to the day when you can select electronic information in either print or video form.

4. Transmission

Major metropolitan newspapers are now printing their regional editions with electronic impulses transmitted by phone line. Fiber optics and digitizing of images has made this form of electronic transmission more efficient. The new **USA Today** has carried that a step further with electronic images transmitted by satellite to decentralized printing centers around the country.

The next step will be transmission of images direct to homes and businesses using privately owned satellite receivers. This technology already exists for television. The concave dishes are in use, particularly in rural areas where there is either no cable or very poor reception. Sears and COM-SAT, a privately owned satellite company, hope that through mass marketing the price will drop around $300, and we can all replace our antennas with dishes[4] small enough to sit on a window ledge. When that happens every home and business will have access to unlimited programming and will no longer have to rely on local stations or networks to make program choices.

Effect of Technological Change on Mass Media

In the television series, "Connections," the point is made that certain interrelated events have to happen before we can make major technological and cultural leaps. What will happen when all of the above changes come together in the living room? The day is near . . .

— when every home and business is equipped with its own terminal including a digital television linked by phone or satellite to unlimited networks of information programming and sources.

—when the screen sits side-by-side with a high-quality ink-jet printer capable of producing the finest-quality graphic image.

—when the terminal is equipped with a voice synthesizer so you can talk with it.

When that day comes (and it won't be too far away since all the technology exists at present), it will be possible to access enormous databanks on a TV screen and select material of interest to be assembled in an individually designed program or publication—produced for an audience of one: one's own personal limited edition. And no one will have to worry about audience ratings, mail strikes or newspaper carriers with bad aim.

But what does this mean to the conventional mass media? Television, under the pressure of cable systems and satellites, will bring hundreds of channels with highly specialized programming to every home. This concept of "narrowcasting" to a special interest audience is a byproduct of the rise of the cable industry. The old concept of a mass audience on which network television is based will be challenged by the new media's ability to appeal directly to special interests, or the interests of an audience of one. Magazines, radio, and cable T.V. have already begun the change-over.

And what will happen to "mass education" in an era of personal communication?

Mass culture is currently sustained by the economic system of mass marketing. It is in industry's interest to be able to reach large groups of people as efficiently as possible with commercial messages. As soon as the technology makes it possible to reach an audience of one as efficiently as audiences of one million, then a great cultural shift will occur. The personalization of communication media will change all the basic institutions of society: economics and industry, media, the workplace, politics and government, as well as education.

Implications for Education

One major result of the shift from a mass culture to a personal culture will be an assault on mass public education as we know it. Individualized instruction, instead of mass education, has been an unrealized goal of modern pedagogy. Current educational patterns, however, are based on large schools, classrooms of people all the same age and all doing essentially the same thing, norms, predetermined tracks called grade levels, and even big groups of "different" students labeled with such terms as gifted, slow learners, and educables.

Personal communication media will make individualized instruction a reality, one based on personal interest and motivation, learning style, and readiness level. With this will come more learner responsibility and self direction. Already we are watching a generation of "microkids" grow up, a group of students who are teaching themselves sophisticated computer and programming skills. Thomas O'Brien, a former NATO Senior Research Fellow in Science, has observed there are several points to be learned from these "teen-age computer jocks." He explains: "One is that children (and people in general) are often immensely more able than we think. Second, they are often self-taught. Third, their growth is often self-sustaining." He observes that the third point is often overlooked by parents and teachers "who see themselves as the only source of knowledge."[5]

These people are independent learners working at their own speed with an unusual degree of motivation in ar-

eas of interest to them. Often they are using a second language that they have taught themselves. They are reading technical manuals way beyond their reading levels, learning to do flow charts and computations, and thinking in highly logical patterns.

The 1982 National Assessment for Education Progress found that 62 percent of the 13-year-olds have used computers but only 23 percent have used them at school.[6] Most have access to a personal computer at home. Schools are falling behind, obviously, but the students are keeping up regardless. It also seems obvious that schools are not the only source of literacy and, in this case, the teachers and administrators may be less literate than their students.

This is not an earthshaking phenomenon—young people have been teaching themselves about cars, stereos, and model airplane building without teacher direction for years. What is earthshaking is that the new technology will make it possible to tap into that wellspring of personal interest in every child, to stimulate and encourage the inherent motivational set of every learner. In order to do that, however, educational systems have to move away from all the trappings of mass education—the tracks and grade levels, the norms, and the prescribed curricula.

This does not mean the elimination of group-based education. Classes are great laboratories to teach one thing—group processes and social interaction. Socialization has always been an important function of education, and that need will be even more important after the fall of mass culture. As Wallace Judd, a former teacher and now president of a California computer company, commented: "Futuristic visions of students studying exclusively in carrels ignores the fact that people need people."[7] Yet, the need for social contact is only part of the classroom picture, the other mission is to teach what Arthur Shostak, a sociologist and futurist, calls "the art of group membership."[8]

There is no need for large and expensive school physical plants to teach subjects such as sociology, psychology, politics and government. They can just as easily be taught on a neighborhood or block basis using the community or the neighborhood as a living laboratory. There is no need for age grouping either. In terms of learning social interaction, the old one-room schoolhouse with its range of ages and abilities may have been the much more efficient as a learning center.

Two public school educators, William Sharkan and John Goodman, asked in an article in **Instructional Innovator** if the electronic revolution may make classrooms obsolete. Their point is that "parents may decide that buying their own equipment may make more sense than sending them to schools."[9] It is not just the parents' concern over quality education that threatens schools, it is the tremendously expensive system we use for modern education. Schools are costly to run; the public is largely dissatisfied with the product; and taxpayers are in revolt. The concept of "schooling" is vulnerable.

Large schools may become the dinosaurs of the 21st century, but the real question is who will control education in the day when the big schools die? If parents decide to use education on home-based media as the primary delivery source, then the software and media companies will be selling directly to parents—schools could become unnecessary middlemen—as unnecessary as advertising agencies in the day of personalized marketing.

I a satirical piece in **Phi Delta Kappan**, Robert Snider, a staff member of the National Education Association, pro-

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jects a time in the 1990s when education is dominated by a small number of very large, very powerful, multinational cognitive combines. These "knowledge utilities" supported by tuition tax credits eventually bankrupt the public school systems which are unable to compete.[10] While this is a fantasy piece, there are some very real signals here.

Klaus Haefner points out that the educational system is slow to act and vulnerable as a result: "The information technology industry is fast moving, profitable, powerful and well funded. Compared to this the educational system is slow, inflexible and badly funded."[11] It is quite possible that future education may wind up in the hands of private industry as the development of personal media make it possible to teach efficiently and turn a profit at the same time. As the market continues to develop, it is realistic to expect a greater proportion of our best talent in education will leave education for the more lucrative and responsive private sector. This will be particularly true of those trained in instructional design.

Teachers

Obviously the role of teachers will be affected by whether education continues to be directed by publicly funded professional educators or by privately employed educational marketers. Assuming that public education can stay ahead of the changes, then the role of teacher will continue to exist—but the role may change radically. The biggest change for teachers will be that of moving from being the source of information to being a manager of the information searching process.

Teachers' daily activities will change. They will work independently, running the neighborhood learning centers where they are in charge of developing and monitoring their students' progress. More time will be spent in diagnostic and planning activities; less time will be spent in delivery of instructional content. Teachers will have more time to be involved with the personal self-development of each child. Such topics as self-concept and self-motivation will be critical concerns for future teachers. With learning programs based on patterns of self-interest, the teacher's greatest challenge will be to analyze and stimulate each student's individual set of interests and curiosities.

Content

Access to enormous databases through the home terminal suggests a major shift in our view of knowledge. A traditional view of an educated person is someone who knows much. The traditional teacher's role is disseminator of knowledge. With student access to unlimited information, the ability of the human brain to contain knowledge will be much less important than the ability to search, organize and present knowledge.

Content areas, as we know them, may be less relevant than ways of thinking in the particular disciplines. There may be a shift from learning science to learning scientific method—with scientific knowledge evolving too fast to be learned. "Learning facts" is simply a procedure for stopping the evolution of knowledge and capsulizing what is known at that point in time. It may become an archaic activity. Judgment, logic and communication skills will be essential. Thinking, planning, evaluating and problem solving will be more important than knowing.

Dorothy Deringer, program director of the National Science Foundation, makes the point that computer programs

can do the mechanical operations of solving equations better and faster than mathematicians—these programs allow students to concentrate on "the thinking portion of algebra—problem formulation and solution."[12] She also observes that some skills rarely taught in a traditional curriculum may be even more important in the Information Age. Estimation, for example, is something the human brain can do better than the computer. Computers provide the information, but it takes a human brain combined with intuition and experience to successfully estimate outcomes. She asks, "Shouldn't we be concentrating on developing thinking skills and devoting less time to mechanical techniques?"

Creative skills are needed for problem solving but creativity extends beyond that into the realm of thinking the unknown—inventions. Two education professors, Christopher Dede and Dwight Allen, wrote in the **Phi Delta Kappan** that a "now neglected but potentially vital skill is creativity, a special talent within all individuals that allows construction of alternate responses to problem or tasks."[13]

Some writers wonder if we have reached a plateau in our inventive power. The microchip is seen as the last great breakthrough. The new era is predicted to be one of maintenance, adaption and application. Invention arises form a curiosity about how things work, and that capacity must be encouraged. Our society has shifted to a mental set of "replace" rather than "repair," and with that shift we may be losing certain skills necessary to fuel the inventive capacity.

Teacher Education

The shift in the content of education will mean a concomitant shift in teacher education. There will be less need for specialized methods courses focusing on the collected knowledge of an area and more need for universal information processing skills. A net profit from this shift will be more efficient teacher training and few required courses in teacher education curricula.

The educated person in the electronic Information Age will need to know how to manipulate vast data banks—how to access, sort, search, specify, store and retrieve information. And that's just to be an educated user of information. The processors of information will need logic, organization and explanation skills. They will have to package information so it can be retrieved by other users. One of the flat tires in the microcomputer bandwagon is poorly designed software. And even if the software does what its designer hoped it would do, the accompanying documentation is often dreadful. The challenge to teacher education is to develop curricula which produce educators with the skills to teach others to think logically.

Education is becoming more and more of a personal ongoing process. As education becomes personalized and self-directed, then learners will find themselves in a continuous process of education and re-education. The concept of "schooling" with its discrete time lines will collapse. Deringer describes a society in which the educated person is a self-starter and self-renewing.[14] Herman Niebuhr, a psychologist, also describes education as self-directed and lifelong. He observes that retraining may be just as important as initial training.[15] If schools can help people teach themselves and direct learning along the lines of personal self-interest, then the role of education in the electronic Information Age may be bigger and brighter than it is now because people will never "leave school."

Notes

1. Ed Nash, "Getting the Picture: 1990s chips and blips," **Advertising Age** (November 15, 1982), pp. 24-26.

2. Ibid.

3. John Hillkirk, "Japan Stars at Gee-whiz Hi-tech Show," **U.S.A. Today** (January 11, 1984), p. 2.

4. Mel Friedman, "1986: Will the Time Be Prime for DBS?" **Madison Avenue** (March 1983), pp. 50-58.

5. Thomas C. O'Brien, "Five Essays in Computers in Education," **Phi Delta Kappan** (October 1983), pp. 110-112.

6. Dorothy Deringer, "New Directions for Education in the Information Society," **T.H.E. Journal** (September 1983), pp. 110-111.

7. Wallace Judd, "A Teacher's Place in the Computer Curriculum," **Phi Delta Kappan** (October 1983), pp. 120-122.

8. Arthur B. Shostak, "The Coming Systems Break: Technology and Schools of the Future," **Phi Delta Kappan** (January 1981), pp. 356-358.

9. William Sharkan and John E. Goodman, "Improving the Climate for Educational Technology," **Instructional Innovator** (May 1982), pp. 12-13.

10. Robert Snider, "Terminal Time in the Classroom," **Phi Delta Kappan** (October 1983), pp. 113-115.

11. Klans Knefner, "Challenge of Information Technology to Education: The New Educational Crisis," **T.H.E. Journal** (January 1982), pp. 47-52.

12. Deringer, op. cit.

13. Christopher Dode and Dwight Allen, "Education in the 21st Century: Scenarios as a Tool for Strategic Planning," **Phi Delta Kappan** (January 1981), pp. 362-366.

14. Deringer, op. cit.

15. Herman Niehbuhr, Jr., "Teaching and Learning in the Eighties: The Paradigm Shifts," **Phi Delta Kappan** (January 1981), pp. 367-368.

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